

AMENDMENTS TO THE SPECIFICATION

IN THE TITLE:

DEVICE AND METHOD FOR DETECTING THE DRIVE STATE OF A
TURBO PUMP IN A ~~TENDETRO~~ TANDETRO ACCELERATOR OF AN ION
IMPLANTATION DEVICE

IN THE SPECIFICATION:

Please replace the paragraph beginning at page 1, line 10, with the following rewritten paragraph:

The present invention relates to a device and method for detecting a turbo pump driving state in a ~~tendetron~~ tandetron accelerator of an ion implantation device. More particularly, the present invention relates to a device for detecting a driving state of a turbo pump for forming a vacuum state in an accelerator, by which an ion beam is accelerated to implant ions onto a semiconductor wafer. The present invention also relates to a method of operating such a device.

Please replace the paragraph beginning at page 1, line 16, with the following rewritten paragraph:

Generally, ion implantation into a wafer is performed under a condition in which an electrically charged atom has a sufficiently large amount of energy to penetrate through the surface of a non-conductive wafer. A ~~tendetron~~ tandetron accelerator that accelerates an ion beam includes inside of it a turbo pump for circulating argon gas (Ar) within. The ~~tendetron~~ tandetron accelerator is supplied with a high voltage of 650 KV at the stripper portion where the turbo pump is mounted,

and the power driving the turbo pump is generally 30V. As a result, the practical externally-supplied voltage is 650 KV + 30V. Accordingly, the corresponding power could not be both easily and sufficiently supplied externally while still maintaining a sufficient insulating state of the accelerator.

Please replace the paragraph beginning at page 2, line 3, with the following rewritten paragraph:

Fig. 1 is a diagram showing the structure of a conventional device for detecting a turbo pump driving state of a ~~tendetron~~ tandetron accelerator by which a sufficient insulating state is maintained.

Please replace the paragraph beginning at page 4, line 1, with the following rewritten paragraph:

In order to maintain a stable state of the high voltage supplied to the ~~tendetron~~ tandetron accelerator, SF₆ gas having an insulating characteristic fills the inner side of the accelerator at a high pressure of 85 psi. Accordingly, when any inner device of the ~~tendetron~~ tandetron accelerator fails, it takes about 10 hours to first discharge and later refill the device with this gas in order to repair the device.

Please replace the paragraph beginning at page 4, line 6, with the following rewritten paragraph:

However, the conventional device cannot exactly detect the turbo pump driving state of the ~~tendetron~~ tandetron accelerator just by measuring the current value being supplying to the motor 10. As a result, even if the current supplied to the motor 10 is optimal, the turbo pump 24 may not be operated normally, and so argon gas may

not be smoothly circulated, thereby causing a change in a charge-converting rate, which can result in a severe process failure.

Please replace the paragraph beginning at page 4, line 16, with the following rewritten paragraph:

However, to do this, electric wires must be laid between the current indicator installed outside of a ~~tendetron~~ tandetron tank and the current detecting part installed inside the ~~tendetron~~ tandetron tank in order to detect a current supplied to the turbo pump and then display such a current on the current indicator. As a result, an electrically insulation state cannot be maintained between the ~~tendetron~~ tandetron tank and the outside.

Please replace the paragraph beginning at page 5, line 1, with the following rewritten paragraph:

Accordingly, it is an object of the present invention to provide a device for detecting a turbo pump driving state in a ~~tendetron~~ tandetron accelerator by detecting a driving current of the turbo pump in the accelerator. It is also an object of the present invention to provide a method for operating such a device.

Please replace the paragraph beginning at page 5, line 14, with the following rewritten paragraph:

In order to accomplish the above objects, a device for detecting a turbo pump drive state in a ~~tendetron~~ tandetron accelerator of a semiconductor ion implantation device according to the present invention comprises a turbo pump formed inside of the accelerator; a current detecting part formed inside of the accelerator for detecting a turbo pump driving current applied to the turbo pump, and providing a first

electrical signal indicative of the detected turbo pump driving current; an electro-optical converter formed inside of the accelerator for converting the first electrical signal to an optical signal; a photoelectric converter formed outside of the accelerator for converting the optical signal to a second electric signal; an optical cable formed between the electro-optical converter and the photoelectric converter for carrying the optical signal out of the accelerator; and a displaying part formed outside of the accelerator for receiving the second electric signal and displaying the turbo pump driving current contained in the second electric signal.

Please replace the paragraph beginning at page 7, line 2, with the following rewritten paragraph:

The optical cable preferably maintains an electric insulating state between a ground of the ~~tendetron~~ tandetron accelerator and a high voltage of the stripper.

Please replace the paragraph beginning at page 7, line 5, with the following rewritten paragraph:

A method of detecting a turbo pump driving state in a ~~tendetron~~ tandetron accelerator of a semiconductor ion implantation device is also provided. This method includes detecting a current applied to a turbo pump in the ~~tendetron~~ tandetron accelerator; outputting the detected current as an optical signal; transmitting the optical signal through an optical fiber that passes from inside of the accelerator to outside of the accelerator; converting the optical signal transmitted through the optical fiber to an external electric signal; and displaying a current value of the external electric signal.

Please replace the paragraph beginning at page 8, line 11, with the following rewritten paragraph:

Fig. 2 is a diagram showing the structure of a device for detecting a turbo pump drive state in a ~~tendetron~~ tandetron accelerator according to a preferred embodiment of the present invention.

Please replace the paragraph beginning at page 8, line 17, with the following rewritten paragraph:

Fig. 2 is a diagram showing a device for detecting a turbo pump drive state in a ~~tendetron~~ tandetron accelerator according to a preferred embodiment of the present invention.

Please replace the paragraph beginning at page 8, line 19, with the following rewritten paragraph:

The turbo pump drive state-detecting device in a ~~tendetron~~ tandetron accelerator of a semiconductor ion implantation device according to the preferred embodiment of the present invention includes a motor 40, a first pulley 41, a belt 42, a second pulley 43, a shaft 44, a generator 46, a turbo pump 48, a cable 50, a current detecting part 52, an electro-optical converter 54, an optic fiber 56, a photoelectric converter 58, an interlock generator 60, an accelerator power supply 62, and a displaying part 64.

Please replace the paragraph beginning at page 9, line 12, with the following rewritten paragraph:

The current detecting part 52 is connected to the cable 50 that supplies the drive power of the turbo pump 48, to detect the current applied to the turbo pump 48 in the ~~tendetron~~ tandetron accelerator and output an electrical signal indicating the value of the detected current. The electro-optical converter 54 converts the detected

current from an electrical signal to an optical signal, which is transmitted over the optic fiber 56. The photoelectric converter 58 receives the optical signal transmitted through the optic fiber 56, and converts it back to an electrical signal.

Please replace the paragraph beginning at page 10, line 16, with the following rewritten paragraph:

The current detecting part 52 and the electro-optical converter 54 are preferably assembled in a board 29 and should be installed at a stripper 28 to maintain an insulating state because a high voltage is applied. That is, the current detecting part 52 and the electro-optical converter 54 are formed inside of the accelerator.

Please replace the paragraph beginning at page 11, line 1, with the following rewritten paragraph:

The electro-optical converter 54 converts the current detected by the current detecting part 52 to a digital optical signal (i.e., a frequency) and then transmits the digital optical signal to the outside of the ~~tandetron~~ tandetron accelerator through the optical cable 56. The optical signal carried on the optical cable 56 is then input to the photoelectric converter 58. The photoelectric converter 58 converts the optical signal to an electric signal, which it outputs it to the interlock generator 60.

Please replace the paragraph beginning at page 11, line 7, with the following rewritten paragraph:

In this design, the signal from the current detecting part 52 is transmitted by the optical cable 56, thereby maintaining an electrically insulating state between the ground voltage of the ~~tandetron~~ tandetron accelerator which is supplied with a high voltage and the stripper which also supplied with a high voltage.

Please replace the paragraph beginning at page 12, line 3, with the following rewritten paragraph:

As described above, the present invention has an advantage in that the current for driving the turbo pump is detected and displayed to allow a user to personally confirm it. In addition, the detected current is compared with a set value to allow a the system to determine whether the turbo pump has failed or not, allowing the system to cut off the power supply to the ~~tendetron~~ tandetron accelerator when it fails.

Please replace the paragraph beginning at page 12, line 8, with the following rewritten paragraph:

In addition, there is an advantage that the detected turbo pump driving current is transmitted between the inner side and outside of the ~~tendetron~~ tandetron accelerator by an optical cable so that an electric insulating state is maintained between the ground voltage of the ~~tendetron~~ tandetron body and the high voltage on the stripper portion.